1999 Environment Review

SaskPower

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Front Cover

the sturgeon project

Photo courtesy of Saskatchewan Environment and Resource Management

SaskPower is committed to protecting the environment while meeting the energy needs of our customers.

A slow-maturing fish, sturgeon have been known to live more than 150 years and can weigh over 450 kilograms. With an outer armour of bony plates, bones made of cartilage and a shark-like tail, sturgeon resemble fossils from the Upper Cretaceous period, more than 100 million years ago.

As a founding member of the Saskatchewan River Sturgeon Management Board, SaskPower released over 40,000 sturgeon fry from a commercial hatchery back into the Saskatchewan River to boost the existing population levels and compensate for the destruction of their natural spawning grounds.

"Our Commitment to Environmental Responsibility"

SaskPower's environmental policy

SaskPower is committed to protecting the environment while providing our customers with safe, reliable and cost-effective sources of electricity.

To us, being environmentally responsible means using natural resources while respecting the need to preserve their potential for use by others, now and in the future. It means building and operating our facilities in a manner that will, to the greatest extent possible, conserve natural resources, maintain natural systems and preserve natural diversity. And it means anticipating and, wherever possible, preventing environmental impacts.

The following principles, adopted by SaskPower's Board of Directors and communicated to all employees, confirm our commitment to improved environmental performance and pollution prevention.

◆

Strive to comply with environmental legislation, regulations and other corporate commitments.

◆

Identify, monitor and manage all significant environmental aspects associated with our operations and services.

◆

Ensure all employees and contractors recognize their environmental roles and responsibilities.

◆

Identify opportunities for continual improvement in cooperation with employees, contractors, suppliers, regulatory authorities, environmental agencies and our customers. Where opportunities arise, implement cost-effective, energy-efficient technologies and improved management practices throughout our operations and services.

◆

Integrate environmental considerations into capital planning and purchasing decisions.

◆

Implement the fundamentals of waste management: rethink, reduce, reuse, recycle and recover.

◆

Provide the public with an annual review of our environmental performance and environmental management programs.

◆

Audit our environmental performance regularly, including auditing for compliance with the ISO 14001 Standard for Environmental Management.

Preface

our sixth annual report

The 1999 Environment Review is our sixth annual report of the programs and initiatives developed and partnered by SaskPower in response to a wide range of environmental issues. In meeting this challenge, we recognize that protecting the environment for future generations is everyone's responsibility – and we take our share of that responsibility to heart.

We are committed to improved environmental performance and pollution prevention. Environmental performance indicators included throughout this report – from greenhouse gas emission offsets to waste management to education and training programs – measure our progress in several areas and, just as importantly, show where we need to improve.

This is our report card, and we invite your comments and suggestions on what we have done, and what we can do to improve upon our commitment to the environment. An evaluation form has been included at the back of this booklet.

A Word on ISO Standards

International Organization for Standardization

In this publication, we refer to ISO 14000 and ISO 14001 standards. ISO refers to the International Organization for Standardization, a worldwide non-governmental federation of national standards institutes from over 130 countries.

The ISO 14000 system defines and documents specific tasks, responsibilities, authorities and procedures to ensure that every employee is able to help minimize negative impact to the environment. The core of the ISO 14000 series is ISO 14001, a standard that defines for us what is required of a sound environmental management system (EMS).

Our EMS ensures that these requirements are communicated throughout the corporation, and that our employees are effectively trained to fulfill their responsibilities. The ISO framework provides the corporation with a renewed focus on regulatory compliance, the prevention of pollution, and the continuous improvement of our environmental management – all of which translate into improved environmental performance.

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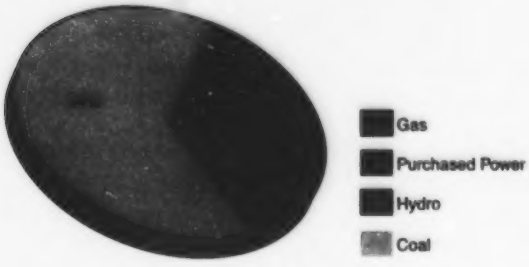
SaskPower at a Glance

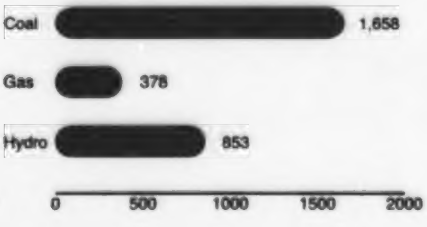
SaskPower serves more than 428,000 customers

With a network of 14 generating stations, and 150,000 kilometres of transmission and distribution lines, SaskPower serves more than 428,000 residential, commercial, industrial and farm customers spread over half a million square kilometres. SaskPower operates three coal-fired thermal stations, one natural gas-fired thermal station, seven hydroelectric stations and three gas turbine plants.

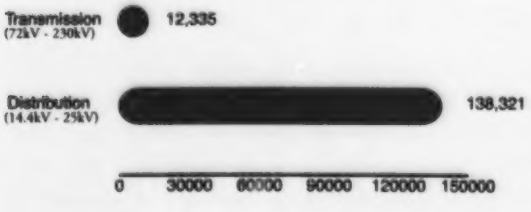
Generation by Fuel Type



Total Installed Capacity (MW) 2,889



Power Lines (Pole km)



President's Message

environmental responsibility is about balance

Environmental responsibility is about balance. We are charged with providing safe, reliable and cost-effective electricity while keeping our commitment to improved environmental performance and pollution prevention.

When I first arrived at SaskPower just over one year ago, I was pleased to learn that the corporation had undertaken a major environmental initiative. The Environmental Commitment and Responsibility Program is an industry-wide initiative developed and implemented by the electric utility members of the Canadian Electricity Association (CEA). Participation in the program requires that SaskPower adopt the following principles:

- reduce the adverse environmental impact of our business;
- be more efficient in our use of resources;
- be accountable to our constituents;
- ensure that our employees understand the environmental implications of their actions; and, have the knowledge and skills to make the right decisions.

As an active participant in the ECR Program, SaskPower is committed to implementing an environmental management system in compliance with the Standard of the International Organization for Standardization ISO 14001. SaskPower employees are to be commended for their efforts in preparing the corporation for registration with the Standard, and I am pleased to report that Boundary Dam Power Station achieved registration with the ISO 14001 Standard in December 1999.

In the Environment Review, you will find an account of the corporation's environmental performance and initiatives, including our continued commitment to the reduction of greenhouse gases. SaskPower is one of the first corporations to take voluntary action to limit or reduce greenhouse gas emissions through Canada's Voluntary Challenge and Registry. Since 1995, SaskPower has taken a multifaceted approach to our climate change goal and we are on target to achieve a reduction of 1.2 million tonnes by the year 2000. We continue to improve the efficiency of our operations, work with customers to find energy savings, and invest in carbon dioxide (CO_2) offset projects.

At SaskPower, we are committed to the energy needs of our customers. We have not forgotten, however, our responsibility to protect the environment and improve our environmental performance. I invite you to read our 1999 Environment Review and allow us to share with you our accomplishments as well as the many challenges that await us in the future.

John Wright, President & CEO
May 2000

Highlights

ISO 14001

As one of the first corporations to take voluntary action to limit or reduce greenhouse gas emissions through Canada's Voluntary Challenge and Registry, SaskPower estimated a total reduction of over 800,000 tonnes of carbon dioxide (CO_2) equivalent in 1999, on target to achieve a reduction of 1.2 million tonnes by 2000.

The Meridian Cogeneration Project began supplying electricity to SaskPower in 1999 from a new natural gas facility at the Husky Oil Lloydminster Upgrader, and is expected to offset our CO_2 emissions by 280,000 tonnes per year.

As part of a formal agreement with Saskatchewan Environment and Resource Management (SERM), Boundary Dam Power Station Unit 4 electrostatic precipitator (ESP) began operation in 1999 and is expected to reduce particulate emissions from that unit by 98 per cent.

SaskPower Customer Services launched a series of new services called SaskPower Energy Solutions, with the first major element being delivered to customers through a strategic alliance with Honeywell Ltd.

Boundary Dam Power Station achieved registration with the ISO 14001 Standard in December 1999. Registration with the ISO Standard for all corporate, generation, transmission and distribution facilities is planned for 2000.

As a founding member of the Saskatchewan River Sturgeon Management Board, SaskPower released over 40,000 sturgeon fry from a commercial hatchery back into the Saskatchewan River to boost the existing population levels and compensate for the destruction of their natural spawning grounds.

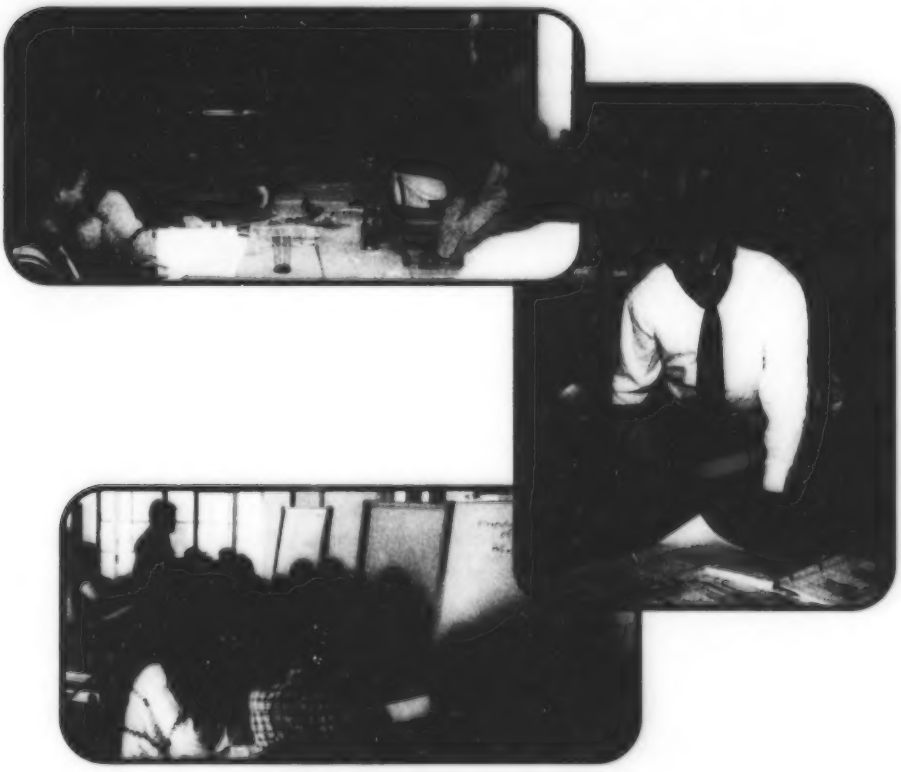
As the first Canadian corporation to sign a Diamond Legacy sponsorship with Ducks Unlimited Canada in Saskatchewan, SaskPower was presented in 1999 with the Blue Heron Award by the North American Waterfowl Management Plan.

In compliance with the ISO 14001 Standard for environmental management systems, SaskPower implemented an environmental awareness training program, which was delivered to over 900 employees in 1999.

ISO 14000 Implementation Team

profile

In 1999, the ISO 14000 Implementation Team, in cooperation with environmental management system representatives across the corporation, worked to implement the elements of the ISO 14001 Standard for all SaskPower facilities. Upon identifying the environmental impacts associated with the corporation's operations and activities, the Implementation Team has sought to determine how best to manage those impacts in preparation for registration with the ISO 14001 Standard in 2000.



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The Reduction of Environmental Impact

At SaskPower, we are always seeking new and better ways to reduce the environmental impact brought about by the production and delivery of electricity to our customers.

Emissions

Greenhouse Gases

The greenhouse effect – so named because the atmosphere acts much like the glass roof and walls of a greenhouse, trapping heat from the sun – is a naturally occurring phenomenon involving warming of the lower atmosphere and surface of the earth through a process involving sunlight, particles and gases in the atmosphere. The greenhouse effect keeps the average temperature of the earth's surface at 15°C. Without it, the average temperature of the earth would be much colder than it is now.

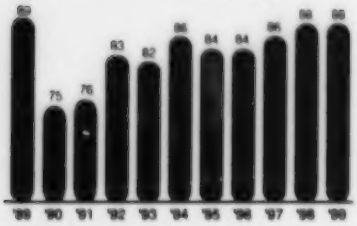
The problem we now face is that certain actions, such as the burning of fossil fuels, are contributing to increased concentrations of greenhouse gases. These increased concentrations could create a gradual warming of the atmosphere and resultant global climate change. It is therefore important to limit the amount of greenhouse gases added from sources such as fossil fuel-based electrical generation.

Greenhouse gases directly emitted by SaskPower facilities consist primarily (97.6 per cent) of carbon dioxide (CO_2), with the remainder consisting of small amounts of methane (CH_4) and nitrous oxide (N_2O). SaskPower is one of the first corporations to take voluntary action to limit or reduce greenhouse gas emissions through Canada's Voluntary Challenge and Registry, and is on target to achieve a reduction of 1.2 million tonnes by 2000. In 1999, we have estimated a total reduction of over 800,000 tonnes of CO_2 equivalent. For more information, see Greenhouse Gas Reductions on page 22.

CO_2 Emissions, Offsets and Credits (approximate tonnes)

	1998	1999
	14,120,000	14,463,000	14,299,000
	101,500	101,800	91,000
	14,018,500	14,361,200	14,208,000

CO_2 Emissions
*Net Generation Intensity (kg/kWh)



*Total generation less electrical service to power stations

An increased demand for electricity combined with a greater reliance on coal-fired generation has resulted in higher levels of emissions intensity over the past decade.

In any given year, CO_2 levels will vary due to the availability of power from our hydroelectric stations.

CO_2 offsets

About CO_2 Offsets

(CO_2) is believed to be
gas primarily
for global warming.
gases (GHG)
to in terms of CO_2
(CO_2e). The amount of
and reduced can
the level of net
gases released into
. A greenhouse gas
as GHG emission
the regular
of the business.
gas emissions resulting
thermal generation of
, for example, when
Power plants trees.

Our plans for the future include a partnership with SERM to plant seedlings in the northern forest for the development of forest carbon reserves and to protect existing carbon reserves. As part of the corporation's Climate Change Program, SaskPower will receive offset credits for these forested areas.

Further, Boundary Dam Power Station has been chosen as the site for a technology demonstration plant, part of the new International Test Centre for Carbon Dioxide Capture being established at the University of Regina. The centre has two components: a pre-commercial scale technology demonstration plant at Boundary Dam and a pilot plant at the university for greenhouse gas technology development and screening. SaskPower has committed $600,000 for the next three years toward the centre's operation.

Our efforts to reduce greenhouse gas emissions also include the development and implementation of strategies such as cogeneration. One such example, the Meridian Cogeneration Project, enables SaskPower to avoid producing thousands of tonnes of CO_2, and is expected to offset our emissions by 280,000 tonnes per year beginning in 2000.

Particulates

In partnership with SERM, priority was given to installing additional electrostatic precipitators (ESPs) for the reduction of particulate emissions at Boundary Dam Power Station. Particulates result from the combustion of fossil fuels, such as lignite coal, and are released to the atmosphere from the stacks of generating stations. ESPs are designed for removing particulates or particles of dust, smoke and other elements from air and gas flows.

Boundary Dam Unit 4 began operation in September 1999. The ESPs at Boundary Dam have been designed to meet a standard of 0.1 lb. of particulate matter/MMBtu (million British thermal units), and are expected to reduce particulate emissions from Unit 4 by 98 per cent. Construction has begun on Unit 3 and similar systems will be installed on the other Boundary Dam generating units at a rate of one installation per year.

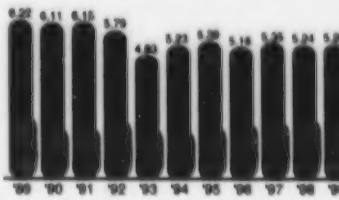
Acid Gases

SaskPower is taking the initiative to reduce acid gas emissions at our coal-fired generating facilities. At Poplar River Power Station, for example, four rows of burners were installed with modifications in generating units to reduce nitrogen oxide (NO_x) emissions. Nitrogen oxides are a form of nitrogen and oxygen that combine together at high temperatures, usually during the combustion of fuels. Nitrogen oxides released into the atmosphere may react with other organic compounds and sunlight to create ground-level ozone, and can also contribute to the formation of acid rain.

Shand Power Station continues to use the LIFAC process (Limestone Injection into Furnace and reActivating of Calcium) for removal of sulphur dioxide (SO_2) emissions. Sulphur dioxide is formed during combustion when the sulphur in a fossil fuel, such as coal, combines with oxygen, and can contribute to the formation of acid rain and other types of air pollution.

Acid Gas Emissions

*Net Generation Intensity (kg/kWh)



*Total generation less electrical service to power stations

SO_2 NO_x

1999 Emissions

Sulphur dioxide (SO_2): 87,600 tonnes

Nitrogen oxides (NO_x): 36,500 tonnes

Meridian Cogen

The Meridian Cogeneration Project

Cogeneration is the simultaneous generation of electricity and useful heat or steam, providing an energy efficient alternative to meeting our customers' needs. The Meridian project in Lloydminster, a joint venture between Husky Oil and TransAlta Corporation, uses a natural gas-fired combined cycle cogeneration facility with two 75-megawatt (MW) gas turbines and a 55 MW steam turbine. The electricity produced is purchased by SaskPower, and a portion of the heat produced from the gas turbines is used to produce steam for the Husky Oil Lloydminster Upgrader.

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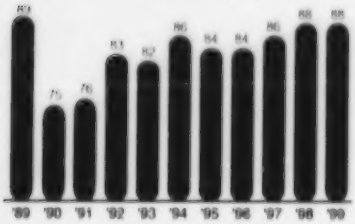

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About CO_2 Offsets

Carbon dioxide (CO_2) is believed to be the greenhouse gas primarily responsible for global warming. Therefore, greenhouse gases (GHG) are often referred to in terms of CO_2 equivalence (CO_2e). The amount of CO_2e generated and reduced can be used to track the level of net greenhouse gases released into the atmosphere. A greenhouse gas offset is defined as GHG emission reductions outside the regular operations of the business. Greenhouse gas emissions resulting from the thermal generation of electricity are offset, for example, when SaskPower plants trees.

CO_2 Emissions, Offsets and Credits (approximate tonnes)

	1997	1998	1999
Total Annual Emissions	14,120,000	14,463,000	14,299,000
Emissions Offset Credits	101,500	101,800	91,000
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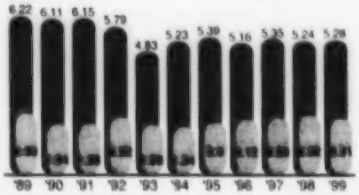

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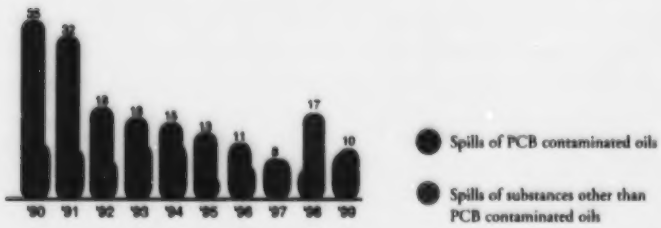
PCBs and Spills

PCBs, or polychlorinated biphenyls, are a group of organic compounds that were used as cooling and insulating fluids in various types of electrical equipment. Because of the potential adverse effects if released into the environment, PCBs require special handling, storage and disposal measures.

SaskPower utilizes our regional storage sites for consolidation of our PCB waste prior to disposal. There were 366 items of PCB waste, including transformers, drums and other containers, in storage at the end of the year. During the year, 197 items of PCB waste were contracted for disposal.

Current legislation requires that spills of hazardous substances, including PCBs, be reported to SERM. Defined by type, volume and location, SaskPower had 19 spills in 1999. The impact of these spills was either negligible or mitigated in an acceptable fashion.

Number of Reportable Spills



Year			Other Spills	Total Spills
'90	9	35	2	46
'91	8	32	2	42
'92	7	18	1	26
'93	8	16	3	27
'94	10	15	1	26
'95	2	13	3	18
'96	3	11	4	18
'97	6	8	2	16
'98	10	6	7	23
'99	6	9	4	19

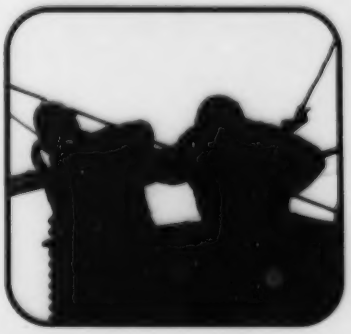
environmental responsibility

The Efficient Use of Resources

The efficient use of resources is an important part of our commitment to environmental responsibility – whether it is through improvements in the generation and delivery of electricity, the reuse and recycling of natural resources, or working with customers to lower their energy costs.

Energy Efficiency

The Generation of Electricity



The demand by our customers for safe, reliable and cost-effective electricity continues to increase, and there are a number of practical options that SaskPower is taking to meet this challenge.

One example is the use of power from cogeneration facilities. In December 1999, SaskPower began buying electricity from the Meridian Cogeneration Project under an agreement that spans 25 years. On average, the unit will supply 210 MW of power, which represents about 10 per cent of forecasted electrical energy use in the province for 2000.

The Transmission of Electricity

As electrical energy is distributed throughout the provincial grid, part of the energy is lost due to resistance in the power line wires. This is known as line loss. Reducing these losses results in more energy available to customers and subsequent lower overall generation requirements.

Grid efficiency has been improved, for example, by the addition of the 230-kV Condie/QE transmission line between Regina and Saskatoon. This addition significantly improves the efficiency of power flow between the company's southern generating facilities and central and northern customers, saving an estimated 129 million kilowatt-hours of electricity per year.

Customer Efficiencies

Solving our customers' energy consumption problems is a priority at SaskPower. To serve the needs of our large commercial, industrial, and institutional customers, SaskPower Customer Services has launched a series of new services called SaskPower Energy Solutions. The first major element of this new series is a performance contracting program, which is being delivered to customers through a strategic alliance with Honeywell Ltd.

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The new program is aimed at large commercial customers, school boards, hospitals and other institutions. While the SaskPower Energy Solutions team will determine the efficiency of lighting, ventilation and technical equipment, the contract also provides for training staff and improved scheduling procedures. A facility's total energy consumption will be reviewed, including all utility costs, such as water, natural gas, oil, propane and electricity.

Materials and Waste Management

Flyash

Like most industrial processes, coal-fired generating stations create waste materials, producing a number of by-products including dust, ash particles and gases. The combustion of coal in thermal power generating stations produces natural ash by-products, including flyash.

Flyash Use (approximate tonnes)

	1997	1998	1999
Total Ash Produced*	500,000	500,000	500,000
Total Ash Used	83,500	84,000	45,500
Percent Used	15%	15%	9%

* Total saleable ash produced is estimated annually as 500,000 tonnes.

Flyash is a light gray or tan powder that is collected by electrostatic precipitators and can be used as a cement replacement for mine backfill operations and oil well remediation. SaskPower markets flyash to the redi-mix concrete, oil well service, and mining industries.

The flyash collected at our thermal generating stations is measured by the amount of ash redirected from disposal to productive use, thereby avoiding the need for consuming new resources. In 1999, SaskPower sold over 45,500 tonnes of flyash. The decrease in flyash sales from previous years, however, may be attributed in part to lower oil prices on the world market for the reporting year.

Electrical Insulating Oil

SaskPower has traditionally reused all of the oil generated through the scrapping of transformers. Once the oil has been decontaminated of PCBs and upgraded to restore its electrical insulating properties, it can be used in refurbished and repaired transformers and in the manufacture of new transformers. Reusing existing inventories of insulating oil reduces the amount of new oil required for insulation and limits the volume of oil that would have otherwise been disposed of as waste.

SaskPower is reusing less electrical insulating oil than in previous years. Although, the corporation continues to recycle insulating oil for use other than in electrical equipment, we have found that upgrading all oil for reuse in transformers is not economically feasible.

Zero G

At SaskPower, we are committed to the recovery and conservation of resources and materials used throughout our operations. Our Zero Garbage waste management program, for example, involves the efforts of employees who have recycled several thousand tonnes of paper and other waste products since 1993. The Zero G program, based on the "Five Rs" of waste management (rethink, reduce, reuse, recycle and recover) is being carried out at SaskPower offices, generating stations, and transmission and distribution facilities throughout the province. In 1999, SaskPower recycled approximately 50,000 kilograms of paper from Regina head office.

Head Office Waste Audit (approximate kilograms)

	1993	Average	1998	1999
White paper	75	15	2	2
Coloured paper	120	15	5	2
Other recyclables	45	25	25	25
Non-recyclables	110	45	45	25

Regular audits measure the volume and types of materials diverted from landfills, providing an accurate measurement of waste reduction. Every year, summer students conduct audits at about 60 SaskPower facilities throughout the province. In May, a waste audit was conducted at the SaskPower head office in Regina to determine how much recyclable material actually made its way into the garbage. We were pleased to find a decrease in the amount of paper found in the garbage compared with other years, and a decrease in the level of non-recyclables. However, the category of other recyclables remains high.

Boundary Dam Power Station, an active participant in the Zero G waste management program, recycled 1,030 kilograms of cardboard, 7,710 kilograms of white and colored paper, and 450 kilograms of newsprint. Boundary Dam recycles a variety of other items that are not tracked, such as aerosol and aluminum cans, glass bottles and small gas cylinders. In 1999, over 150 kilograms of food waste was diverted from the Boundary Dam Power Station landfill through use of the vermicomposting project, maintained by SaskPower employee volunteers.

At the SaskPower head office, Environmental Programs initiated a trial vermicomposting bin to reduce the amount of food waste in the garbage. This odor-free method of composting involves the use of red wriggler worms to compost food materials indoors. The red wriggler can eat up to its own weight in food every day.

As part of our waste management policy, we believe in using environmentally responsible products that have a good environmental track record. Products with minimal packaging, low manufacturing waste, longer life expectancy, and reusable and recyclable components receive a more favorable environmental rating in the awarding of contracts.

Purchasing

As part of our commitment to the recovery and conservation of resources and materials throughout operations, SaskPower reviews all potential purchases with regard to t possible environmental implications various products and services. Recommendations are provided covering possible regulatory constraints and alternative products services that may reduce environmental impacts. These are included in final tendering and purchasing decisions.

The new program is aimed at large commercial customers, school boards, hospitals and other institutions. While the SaskPower Energy Solutions team will determine the efficiency of lighting, ventilation and technical equipment, the contract also provides for training staff and improved scheduling procedures. A facility's total energy consumption will be reviewed, including all utility costs, such as water, natural gas, oil, propane and electricity.

Materials and Waste Management

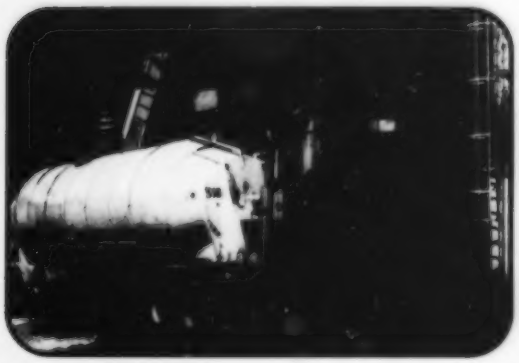
Flyash

Like most industrial processes, coal-fired generating stations create waste materials, producing a number of by-products including dust, ash particles and gases. The combustion of coal in thermal power generating stations produces natural ash by-products, including flyash.

Flyash Use (approximate tonnes)

	1997	1998	1999
Total Ash Produced*	500,000	500,000	500,000
Total Ash Used	63,500	64,000	45,500
Percent Used	13%	13%	9%

* Total saleable ash produced is estimated annually as 500,000 tonnes.



Flyash is a light gray or tan powder that is collected by electrostatic precipitators and can be used as a cement replacement for mine backfill operations and oil well remediation. SaskPower markets flyash to the redi-mix concrete, oil well service, and mining industries.

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Environmental Accountability

the preservation of natural diversity

Our commitment to environmental responsibility is demonstrated through a wide range of initiatives aimed toward improved environmental performance, pollution prevention and the preservation of natural diversity.

Environmental Audits and Assessments

Audits

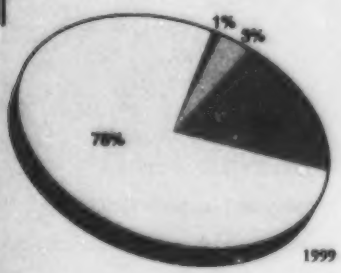
In keeping with our commitment to conduct independent audits and assessments of the corporation's compliance with regulatory requirements and responsible environmental practice, SaskPower has maintained a program to audit generation, transmission and distribution facilities since 1991. As an outcome of the facility audits, management action plans with implementation schedules have been developed to ensure timely resolution of audit observations. Progress on the management action plans is reported semi-annually to the Audit Committee of the Board of Directors.

In 1999, emphasis was placed on facilitating the ISO 14000 registration process with each of SaskPower's registerable units undergoing an internal environmental management system audit in preparation for registration with the ISO Standard in the following year. Boundary Dam Power Station achieved registration in December 1999.

For 1999, management action plans (MAP) from previous audits were 78 per cent complete with 3 per cent in progress, 18 per cent requiring no action and less than 1 per cent outstanding, with the recommended course of action under review.

An account of SaskPower's annual auditing activities is also included in the new environmental performance index (EPI), which has received Executive approval. The EPI is part of a corporate performance scorecard that tracks a variety of corporate-wide indicators, including operational costs, reliability, safety, and customer satisfaction.

Facility Audit Compliance



- MAP complete
- MAP requiring no action
- MAP in progress
- Map outstanding

MAP complete -
Action taken and observation resolved
MAP requiring no action -
No action required and observation resolved
MAP in progress -
Action in progress to resolve observation
MAP outstanding -
Past targeted completion date, and may or may not be in progress

	1995	1996	1997	1998	1999
MAP complete	58%	51%	69%	72%	78%
MAP requiring no action	15%	17%	18%	18%	18%
MAP in progress	16%	20%	12%	10%	3%
MAP outstanding	11%	12%	1%	1%	1%

Environmental Screening and Field Assessments

To ensure compliance with provincial and federal impact assessment and other environmental legislation, SaskPower screens internally all generation, transmission and distribution projects before construction begins. If environmentally sensitive lands are potentially impacted or affected, project plans are referred to Environmental Programs for review. Projects are examined to determine if permits are required for lands where there is a potential for environmental disturbance, or if more complex environmental reviews by government agencies are required.

In 1999, a total of 114 SaskPower project referrals were received. There has been a noticeable increase in project referrals since the delivery in 1997 of the Environmental Screening Training Course to field staff. For more information, see page 17.

Project Referrals

Project Referrals	Number of projects
1996	47
1997	93
1998	102
1999	114

Site Assessments

Site assessments are conducted prior to the sale, purchase or lease of property, or as a result of potential contamination identified during an environmental audit. If necessary, site remediation is initiated once the assessment process has been completed. Major facilities undergo a formal decommissioning process that includes site assessment and remediation. In 1999, the following site assessment and remediation activities were conducted:

Project Referrals and Field Assessments (1999)

Project Type	Referrals	Field Assessments
Generation	1	1
Transmission	9	7
Distribution	104	22
Total	114	30

- *Radville Warehouse*

The Radville Warehouse, a former diesel power station, was demolished in 1998 in preparation for the decommissioning of the site. Upon removal of the concrete substructure, hydrocarbon contamination was found. A Phase II Environmental Site Assessment was conducted to delineate the extent of the hydrocarbon contamination. The concentrations of PCBs and metals were also assessed during the Phase II investigation. Although no PCBs were found, at one location the copper concentration exceeded the applicable soil quality guideline. A decommissioning plan was prepared and approved by SERM and the Town of Radville. In accordance with the plan, the hydrocarbon and the copper contaminated soil was removed from the site and placed at the Town landfill. The Town of Radville has agreed to landfarm the hydrocarbon contaminated soil and SaskPower will monitor the hydrocarbon degradation.

- *Rosetown Warehouse*

The Rosetown Warehouse property is the site of former coal and diesel power stations. A preliminary site assessment of the property identified elevated concentrations of PCBs, metals, and petroleum hydrocarbons in the soil. A clean-up plan was prepared and soil with PCB concentrations above criteria was removed from the site. After the demolition of the warehouse and the removal of the concrete substructures associated with the former power stations, a Phase II Environmental Site Assessment was completed. The Phase II Assessment delineated the areas of hydrocarbon and metal contamination and confirmed the effectiveness of the PCB cleanup. Remediation of the site is planned for 2000.

- *Kelvington District Office*

A Phase II Environmental Site Assessment was conducted at the Kelvington District Office, a former diesel power station. The Phase II Assessment was undertaken to evaluate the site for metal, PCB, and hydrocarbon contamination. No PCBs were detected in the soil

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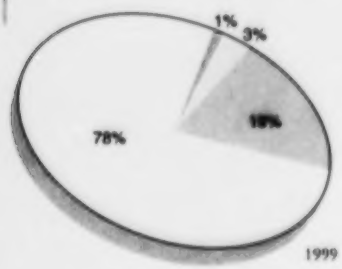

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samples and the metal concentrations were within normal ranges. However, at one location on the site, hydrocarbon contamination was found, which exceeded the SERM guideline. Site remediation is scheduled for 2000, prior to the sale of the property.

- Wollaston Lake Diesel Power Station

The Wollaston Lake Diesel Power Station was assessed for petroleum hydrocarbon contamination in 1993, shortly after the Power Station was decommissioned. Concentrations exceeding criteria were identified in the diesel fuel storage area and at the location of the former diesel supply pump. The pump was used to transfer fuel to the storage area upon delivery to Wollaston Lake. A follow-up investigation in 1999 also included assessment of the soil in the area of the former electrical substation for PCBs. Concentrations of petroleum hydrocarbons in both the fuel storage and pumphouse areas remain above criteria. However, the impacts are restricted to the surface soil and concentrations are decreasing naturally. No PCBs were found in the area of the former electrical substation.

- LaRonge Diesel Generating Station

Additional monitoring was conducted of the hydrocarbon contaminated soil from the clean-up of the LaRonge Diesel Generating Station. Test results indicate that, although some degradation has occurred, certain areas remain above the provincial guideline. Such areas will continue to be monitored until acceptable levels are achieved.

- Substations

Seven former substations were assessed prior to being released for sale. Soil samples collected at the substations were analyzed for PCBs, hydrocarbons, and metals. Remediation at one site is necessary before the property can be released for sale.

- Property Acquisitions

Four properties were assessed prior to finalizing the purchase agreements. One site requires the removal of an underground storage tank before the property can be used.

Decommissioning

Clean-up of hydrocarbon contamination at the Apparatus Repair Shop (ARS) site by SaskPower was initially conducted in 1998. There were, however, areas adjacent to and under the building on site which were inaccessible. In 1999, the City of Saskatoon demolished the ARS building. SaskPower's remaining clean-up involved removal of 300 cubic metres of contaminated soil. Soil testing was done following excavation to insure all contaminants were removed to the satisfaction of the City of Saskatoon and SERM.

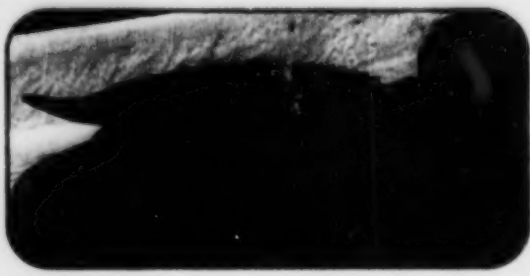
Mitigation

SERM Partnership

SaskPower is working in partnership with SERM and SaskWater to identify and resolve environmental issues on the Saskatchewan River associated with the corporation's hydroelectric operations. The partnership identified significant issues regarding impacts

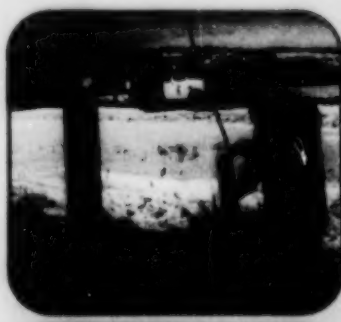
to piping plovers on Lake Diefenbaker, periods of low dissolved oxygen levels in the release from Nipawin Hydroelectric Station, and sturgeon population decline downstream of E.B. Campbell Hydroelectric Station.

SaskPower is a founding member of the Saskatchewan River Sturgeon Management Board, which was established in response to a declining commercial fishery and domestic catch in the Saskatchewan River. A four-year study, funded in part by SaskPower, examined the problem of a declining sturgeon population. Population isolation and the destruction of important spawning grounds during the construction of SaskPower's E.B. Campbell Hydroelectric Station and Manitoba Hydro's Grand Rapids Station have been cited as major reasons for declining sturgeon stocks.



Over 40,000 sturgeon were hatched and released into the Saskatchewan River to boost existing population levels and compensate for the destruction of their natural spawning grounds. Spawning female sturgeon were injected with a hormone to induce ovulation at a spawn camp near Cumberland House. The resulting eggs were then fertilized and flown to a fish hatchery in Grand Rapids, Manitoba, where they yielded more than 43,000 sturgeon fry – a hatching success of 90 per cent. Among those hatched, 33,000 were released at Cumberland House while the remaining 10,000 were reared to fingerlings and released at The Pas, Manitoba.

Osprey Relocation Project



Early in the year, a pair of osprey found a new home upon their arrival back to the banks of the South Saskatchewan River near the town of Rosthern. The rare raptor winters in Ecuador and returns in the spring. Twenty-five pairs have been identified in northern Saskatchewan, but Saskatoon-area birders were excited to find the protected white and brown-speckled bird so far south and close to an urban area.

In February, charge district operator, Keith Reeder, carefully removed the osprey nest, over 20 kilograms of twigs and sticks, from the top of a 25-kV line that serves the water pumping station for the Wakaw area. District operator, Ken Morash, (top photo at right), helped collect and move the sticks, grass and feathers to the new nest site 150 metres away. Rosthern Transmission and Distribution staff arranged for a pole to be installed closer to the river, offering the osprey pair a new home with a better view.

Donning his spurs, David Miller, (center photo at right), of the Saskatoon Nature Society climbed up the 10-metre pole to build a nesting platform. A pulley system ensured the bundle of twigs arrived safely up top where the nest was carefully reconstructed awaiting the birds' return. By moving the nests, SaskPower eliminates the possibility of fire that endangers the rare birds and could potentially lead to a major power outage.

It was later determined in July that the returning osprey pair had not only accepted the new nest site but had hatched two chicks, (bottom photo at right), which have been banded for identification. Each metal band has an identification number and an address on it so the band can be returned if found. Osprey lay two to four eggs in a nest of sticks, plant matter and down, which hatch in about five weeks. The young, who are fed by both parents, fledge from six to eight weeks after they hatch.

Power Line Safety

- Vegetation under Power Lines

When left to grow too close to power lines, tall trees pose a potential threat to electrical system reliability and safety, causing power outages and interruptions in electrical service to our customers. The selective use of herbicides, following mowing, offers long-term control of tall trees. Only problem trees are selected for treatment, leaving an increased number of desirable species such as shrubs, wildflowers and berry producing plants. Herbicides are regulated through the Pest Control Products (Canada) Act, which determines the products that may be used and the conditions of use.

In 1999, SaskPower conducted integrated vegetation management with the use of selective, non-residual herbicides on transmission line rights-of-way in southeastern Saskatchewan, and on distribution line rights-of-way in the Yorkton and Prince Albert areas.

- Electric and Magnetic Fields

Electric and magnetic fields (EMF) are invisible lines of force associated with any electrical device. Power lines, electrical wiring and household appliances all produce electric and magnetic fields. Although concerns have been raised about the possible health effects associated with exposure to these fields, major research studies reported in 1999 from the United States, the United Kingdom and Canada continued to find that health risks associated with electric and magnetic fields have not been established. The U.S. National Institute of Environmental Health Sciences (NIEHS), for example, reported that after six years of accelerated, congressionally mandated research, "the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm."

In response to the concerns of our customers, EMF literature on recent research reviews and studies is available through Environmental Programs. In addition, SaskPower has implemented a measurement program for residential, commercial and occupational field levels.

Habitat Offset Management Program

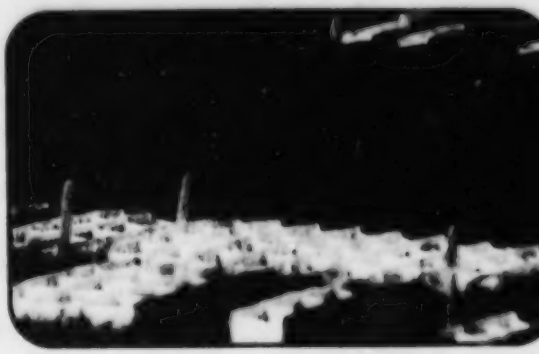
SaskPower is working to actively preserve and restore natural habitat in Saskatchewan to offset any land taken out of its natural state as a result of electrical generation or transmission facilities. In 1999, the following initiatives were implemented as part of our habitat offset management program:

- Shand Greenhouse

Located near Estevan, our greenhouse draws excess heat from nearby Shand Power Station to propagate native vegetation for conservation and reclamation programs. In 1999, Shand Greenhouse distributed over 340,000 seedlings. Approximately 43 per cent of the seedlings were distributed through TREEmendous Saskatchewan.

Germination trials were conducted at the greenhouse on five rare native plant species for Luscar Coal Ltd., including purple coneflower, bird's foot trefoil, white milkwort, salt bush, and whorled milkweed. These species will be used in a coal mine restoration project in the

future. Other research included the planting of a nursery trial to assess survival of seedling stock. By August, the trial indicated an average survival rate of 92 per cent.



Each year, Shand Greenhouse undertakes a field survey of trees that have been planted through the TREEmendous Program. The survey is designed to assess species survival, satisfaction with the program and any problems that may arise. The 1999 survey showed survival in the first year at 68 per cent, dropping in the second and third years to 48 per cent and 25 per cent respectively. The decrease in the survival rate is attributed to lack of maintenance, animal predation and inappropriate planting locations. Results may vary largely by species and project type.

- *Ducks Unlimited Partnership*

As the first Canadian corporation to sign a Diamond Legacy sponsorship with Ducks Unlimited Canada in Saskatchewan, SaskPower was presented in 1999 with the Blue Heron Award by the North American Waterfowl Management Plan.

Ducks Unlimited initiatives funded by SaskPower include a program to restore the Birch River Dam in the Cumberland marshes, the largest waterfowl habitat project in North America. The partnership also funded programs to provide flushing bars to farmers for prevention of wildlife mortality during haying operations, and to commercially develop native plant seeds for habitat and reclamation.

Additional habitat offset initiatives, which are ongoing, include:

- *Constructed Wetland*

The SaskPower Constructed Wetland, built in 1994 near the Estevan sewage lagoons, is one of the largest of its kind in Canada and the only one in North America providing cooling water to a power station. Each year, the constructed wetland purifies one hundred per cent of the sewage effluent from the City of Estevan for Shand Power Station's cooling requirements, thus eliminating the need for semi-annual releases of Estevan's lagoons. The wastewater represents a significant amount (approximately 30 per cent) of the total water consumed at Shand that would otherwise be drawn from the Rafferty Dam Reservoir.

- *Quill Lakes Solar Panel Project*

The Quill Lakes area, located in east central Saskatchewan, is one of the continent's most important inland water bodies for migratory birds. SaskPower's contribution to the Western Hemisphere Shorebird Reserve Network (WHSRN) site at Quill Lakes of solar powered pumps provides water to four rangeland pastures every summer, which allows shoreline habitat to be fenced off from neighboring cattle.

- *Old Man on His Back Prairie and Heritage Conservation Area*

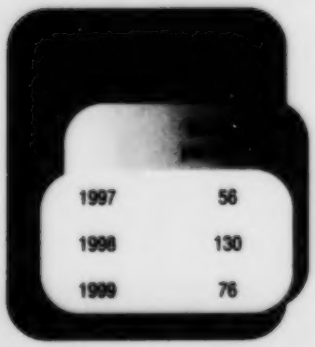
Created in 1996 through a partnership between the Nature Conservancy of Canada (NCC) and SaskPower, this 5,300 hectare prairie and heritage preserve is one the finest shortgrass habitats in Canada.

Environmental Education and Training

preserving our natural resources

At SaskPower, environmental responsibility begins with a shared recognition across the corporation and the communities we serve of the importance in preserving the potential of our natural resources.

Environmental Training for Employees



Environmental Awareness Training Program

In compliance with the ISO 14001 Standard for environmental management systems, SaskPower implemented the Environmental Awareness Training Program for employees. The training program provides employees with an overview of the corporation's Environmental Management System and job-related environmental issues including the role of environmental legislation, due diligence in the management of environmental impact and risk, as well as a review of the proper management of spills, hazardous materials and wastes. In 1999, the new program was delivered to over 900 employees. A computer-based environmental awareness training program is being designed for use in 2000.

Environmental Screening Training Program

The Environmental Screening Training Program provides field staff with the information and tools to screen projects in the planning stages for potential environmental and archaeological concerns. The program provides an introduction to a basic screening procedure, supported by an environmental / archaeological constraint map and a user-friendly database which checks for a wide range of environmentally sensitive land in Saskatchewan. By 1999, a total of 262 employees, mainly Regional and District Transmission and Distribution staff, participated in the program.

Educational Programs for Schools and Communities

Shand Greenhouse Educational Programs

In addition to producing and distributing seedlings for conservation and reclamation projects across Saskatchewan, Shand Greenhouse offers a variety of educational programs on the environmental impact of thermal generation. In 1999, Shand Greenhouse provided the following educational programs:

- Informational displays at trade shows and conferences for the Saskatchewan Urban Municipalities Association, Saskatchewan Soil Conservation Association, West Central School Division, Prairie Farm Rehabilitation Association Shelterbelt Centre, and Agribition in Regina where approximately 8,000 children attended the Agri-Ed display.
- The Seedling is Believing program was delivered to over 740 students at 21 schools of the West Central School Division in the Kindersley and North Battleford areas.
- The Trees and Kids program was delivered to over 260 elementary school students. Activities included tours of the Shand Greenhouse, maple syrup production demonstrations, dutch elm disease information, native plant identification and a hot dog lunch.
- The From Our Treehouse to You program enabled SaskPower Customer Services to distribute approximately 15,000 blue spruce seedlings to customers in 37 communities across the province of Saskatchewan.
- The Shand Greenhouse Ambassador program was launched on the SaskPower Kids Corner web site. Four ambassadors from the communities of Tisdale, Glentworth, Montmartre and North Battleford received prizes from SaskPower.
- Approximately 11,000 seedlings were distributed at Canada Day celebrations and an additional 5,000 seedlings were handed out at a SaskPower sponsored Saskatchewan Roughrider football game.

Ducks Unlimited Wetlands Education Program

Ducks Unlimited Canada and SaskPower have joined together to promote wetlands in an educational program for school children. In October, Ducks Unlimited in partnership with SaskPower, announced plans for a program to educate students about the important contributions wetlands make to the preservation of natural diversity. The program will be delivered to schools throughout the province.

The educational program, consisting of a combination of classroom presentations and field trips, was offered to schools in North Battleford, Lloydminster, Saskatoon, Yorkton, Wadena, Melfort and Regina. Ducks Unlimited will expand the program to other centres as additional funding becomes available. SaskPower donated $20,000 to help Ducks Unlimited launch the educational program.

Harmony Foundation for Environmental Leadership Training

As a proud supporter of the Harmony Foundation of Canada since 1995, SaskPower awarded leadership training scholarships this year to Patricia Charles of Senator Myles Venne School in Air Ronge and Lorraine McConwell of Albert Community School in Regina.

The scholarship is intended to provide participants the opportunity to share views on a wide variety of environmental issues and initiatives with educators across Canada and around the world. Established in 1985, the Harmony Foundation has earned international acclaim, including awards from the United Nations and the Commonwealth Federation, for its role in providing environmental education on a global scale.

Sturgeon Aquarium Project

In 1999, SaskPower sponsored the raising of sturgeon in aquariums at two Cumberland House schools as part of the Saskatchewan River Sturgeon Management Board's community education program.

Zero G - Student Audits

In June, students from St. Catherines School conducted a paper audit of SaskPower head office with the help of corporate staff who coached the students through the audit. Students checked the Zero G recycle boxes to determine the extent to which SaskPower staff members were practicing the principles of Zero G recycling. Among the 386 offices audited, over 70 per cent earned a passing grade.

Estevan Inter-cultural Environmental Tour

In July, SaskPower hosted an inter-cultural environmental tour of the corporation's Estevan area electrical facilities and Luscar Coal Ltd. with the cooperation of Saskatchewan Municipal Affairs and Saskatchewan Culture and Housing. The tour enabled three groups of young adults to come together from different cultural backgrounds to learn about the environmental efforts of the corporation.

Facilities on the tour included Shand Power Station, Shand Greenhouse, SaskPower Constructed Wetland, Rafferty Dam and Luscar Coal's Boundary Dam Mine. Environmental Programs assisted in an interpretive tour of a large tipi ring archaeological site near the Shand Power Station.

Cool Down the City Challenge

In September, SaskPower participated in the City of Regina's Cool Down the City Challenge. Employees were asked to find an environmentally responsible means of transportation to and from work for five days. SaskPower employees located in Regina completed 13 per cent of the possible number of green trips, including 24 per cent among the corporation's head office staff. All SaskPower employees in Regina are encouraged to do their part to help the City of Regina reduce carbon dioxide through such activities as walking, roller blading, car pooling or taking public transit to work.

Action by Canadians

In November, SaskPower came on board as the seventh Action by Canadians (ABC) sponsor. The ABC program, launched by the Energy Council of Canada, is an innovative new project that will be delivered nation-wide to educate Canadians about the crucial role they play in reducing greenhouse gas emissions. The program is also expected to provide support for Canada's commitment to reduce its greenhouse gas emissions under the terms of the Kyoto Protocol. Canada has agreed to reduce emissions by six per cent below 1990 levels between 2008 and 2012.

Glossary

CO_2 Offsets
Initiatives designed to reduce net carbon dioxide (CO_2) emissions from the burning of fossil fuels. Offsets are carried out independently of the source emissions.

Cogeneration
The simultaneous production of electricity and steam from a single fuel source.

Electric Fields
Invisible fields of force created by electric voltage, measured in volts/metre (V/m).

Electrostatic Precipitator
A device useful for removing particles of dust, smoke and other elements from air and gas flows.

Flyash
Fine residue resulting from the combustion of pulverized coal used in many modern coal-fired generating stations.

Greenhouse Gases
Naturally-occurring gases such as carbon dioxide, methane and nitrous oxide that trap heat in the earth's lower atmosphere. Many of these are also produced through the burning of fossil fuels.

ISO 14000
International Organization for Standardization (ISO) 14000 series of standards and guidance documents for environmental management.

Kilovolt (kV)
A unit of pressure, or push, of an electric current; 1,000 volts.

Kilowatt-hour (kW.h)
A unit of bulk energy; 1,000 watt-hours. The measurement is generally used for billing residential customers.

Magnetic Fields
Invisible fields of force created by electric current, measured in microtesla (μT) or milligauss (mG).

Megawatt (MW)
A unit of bulk power; 1,000 kilowatts. The output of a commercial generator or power station is usually expressed in megawatts.

Particulates
Emissions of ash particles from the burning of fossil fuels.

Phase I Site Assessment
Includes a review of historical data and a site inspection to determine the potential for contamination.

Phase II Site Assessment
Includes obtaining soil and/or water samples to be analyzed.

Polychlorinated Biphenyls
(PCBs)
Electrical insulating fluid once used in electrical equipment, including transformers and capacitors.

Site Remediation
The elimination or minimization of environmental contamination or degradation that has already occurred.

Reclamation
The process of reconverting disturbed land to its former or other productive use.

SERM
Saskatchewan Environment and Resource Management.

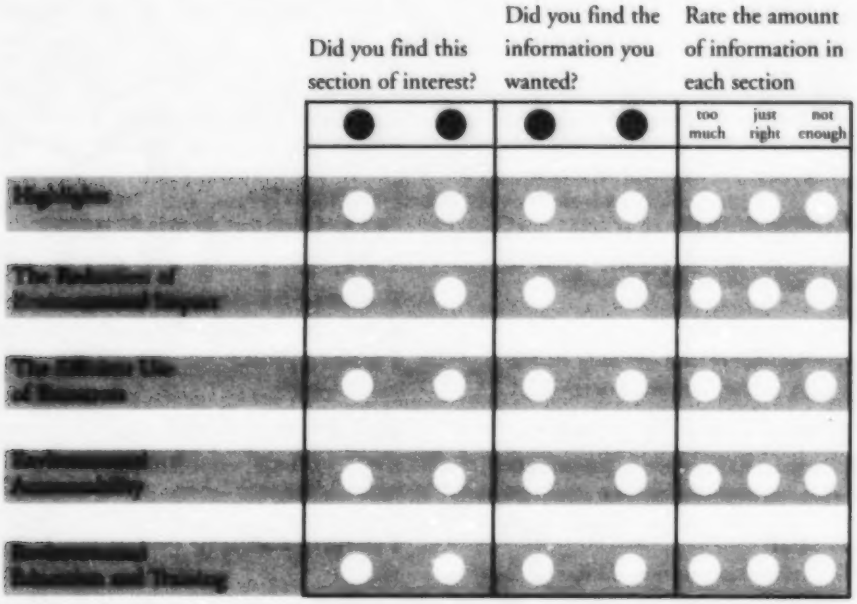
Solar panel
A device that converts sunlight to electricity for use as a power source.

Vermicomposting
The use of a special kind of earthworm to convert organic matter to compost.

Wetland
Swamps and marshes; wetlands help to filter and purify water and provide habitat for various wildlife and migrating waterfowl.

How did we do?

Evaluation


Did you find this section of interest?
Did you find the information you wanted?
Rate the amount of information in each section
too much
just right
not enough

To better meet your expectations and improve our environmental reporting, we invite you to complete this evaluation form and fax or mail it to:

SaskPower
Environmental Programs
3NE-2025 Victoria Avenue
Regina, SK S4P 0S1
Canada

FAX: 306-566-3428

PH: 1-800-667-4749
(Saskatchewan)

306-566-2853
(Regina)

WEB SITE: www.saskpower.com

Did you gain a greater understanding of SaskPower's environmental initiatives?

yes no

How would you prefer to read our Environment Review?

internet mailed copy

Would you like to remain on or be added to the mailing list for future Environment Reviews?

yes no

Name: _____

Address: _____

_____

Do you have any comments or suggestions regarding our Environment Review?

_____

_____

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GREENHOUSE GAS REDUCTIONS (tonnes of CO_2)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	Estimated 1999	Estimated 2000
Transmission & Distribution*											
•Condie/QE								96,000	96,000	96,000	96,000
•Meadow Lake/Buffalo Narrows										4,400	6,300
•Lloydminster/Ermine											8,000
•SCADA system								35,000	35,000	35,000	35,000
•Rural lines						3,500	3,500	3,500	3,500	3,500	3,500
Generation Projects		5,600	224,500	268,500	310,800	365,400	465,700	485,800	508,400	569,500	585,500
Head Office Upgrade							150	150	150	150	150
Recycling				50	80	100	150	150	150	150	150
SUB TOTAL		5,600	224,500	268,550	310,880	369,000	469,500	620,600	643,200	708,700	734,600
Energy Audits/BEMP	3,200	6,960	11,280	15,280	23,200	23,200	23,200	25,800	28,400	31,000	33,600
Health Care Management								1,600	1,600	1,600	1,600
Ice Rink Program							600	2,000	3,300	4,700	6,000
Watson/Canora				50	50	50	50	50	50	50	50
SUB TOTAL	3,200	6,960	11,280	15,330	23,250	23,250	23,850	29,450	33,350	37,350	41,250
Meridian Co-generation											280,000
Flyash Sales	10,000	9,750	9,600	8,750	13,500	16,500	18,000	31,500	31,800	21,000	28,000
Shand Greenhouse			15,700	15,700	14,800	17,100	20,000	20,000	20,000	20,000	20,000
Prairie Conservation							50,000	50,000	50,000	50,000	50,000
Hybrid Poplar											330
Future GEMCo Projects											57,650
SUB TOTAL	10,000	9,750	25,300	24,450	28,300	33,600	88,000	101,500	101,800	91,000	435,980

TOTAL GREENHOUSE GAS REDUCTIONS

(TONNES OF CO_2)

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
13,200	22,310	261,080	308,330	362,430	425,850	581,350	751,550	778,350	837,050	1,211,830

**The energy reduced is converted to an equivalent amount of greenhouse gas using an emission rate of 0.8 kg of CO_2 per kilowatt hour of electricity.*